REPORT

GENERAL WORK PLAN
REMOVAL ACTION, ENGINEERING EVALUATION/COST ANALYSIS, AND FOCUSED REMEDIAL INVESTIGATION
SAN JACINTO WASTE PITS SUPERFUND SITE, HARRIS COUNTY, TEXAS

Prepared for

McGinnes Industrial Maintenance Corporation and

International Paper Company

Prepared by

Anchor QEA, LLC

2113 Government Street, Suite D-3

Ocean Springs, Mississippi 39564

September 2009

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TABLE OF CONTENTS

List of Figures

1 INTRODUCTION

This document outlines the proposed approach for the Removal Action (RA), Engineering Evaluation/Cost Analysis ("EE/CA") and Focused Remedial Investigation (FRI) ("Work") to be conducted for McGinnes Industrial Maintenance Corporation ("MIMC") and International Paper Company ("IPC") at the San Jacinto Waste Pits Superfund Site ("Site"), Harris County, TX, as outlined in the Good Faith Offer letter from MIMC and IPC dated September 18, 2009. The RA and FRI will be performed under an Administrative Order on Consent ("AOC") with the U.S. Environmental Protection Agency ("USEPA"), Region 6. Anchor QEA, LLC will be the primary contractor. A general organization chart for the project is provided in Figure 1-1. A summary of qualifications for Anchor QEA and resumes for key personnel are provided in Attachment 1 of the Good Faith Offer.

The "Site" consists of former pulp paper waste disposal impoundments located along the San Jacinto River near Houston (Figure 1-2). The Site parcel boundary covers approximately 20.6 acres and the waste disposal impoundments are approximately 11.7 acres in total size. The Site waste impoundments are currently inactive, and portions of the original waste impoundments are underwater. In addition, there are contaminated sediments within the San Jacinto River (USEPA/TCEQ 2006) that may be associated with the Site.

The primary hazardous substances documented at the Site are polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (dioxins and furans) (USEPA/TCEQ 2006). Sediment, water, and tissue samples collected in the vicinity of the Site impoundments show elevated levels of dioxins. A consumption advisory based on dioxin is in place on this segment of the watershed (USEPA/TCEQ 2006).

There is a large amount of historical environmental investigations and data associated with Total Maximum Daily Load ("TMDL") and other Texas Commission on Environmental Quality ("TCEQ") investigations relating to dioxins and furans at the Site and in the larger area of the San Jacinto River, Houston Ship Channel, and Galveston Bay. Based on information in those documents, historic aerial photo interpretation, and review of dredging permits presented to USEPA and TCEQ by MIMC and IPC, the area and distribution of dioxins around the Site is complicated by the fact that it was apparently impacted by sand

mining dredging operations carried out in adjacent waters on the north and northwestern perimeter of the Site (on property purportedly owned by Big Star Barge & Boat Company, Inc. ("Big Star") between 1995 and 2000. These dredging operations appear to be responsible for removing portions of the perimeter berms surrounding the Site and dispersing dioxin-contaminated sediments. Dioxin-contaminated sediments appear to have been dispersed by two mechanisms including:

- Discharge of fine-grained dioxin-contaminated material from the Big Star property shown on Figure 1-2 to the west where sand separation operations were conducted
- Exposure of dioxin-bearing materials along the shoreline of the waste impoundments where berms were removed.

The apparent effects of these dredging activities were considered in the development of the proposed Work, as explained in the subsequent sections of this document.

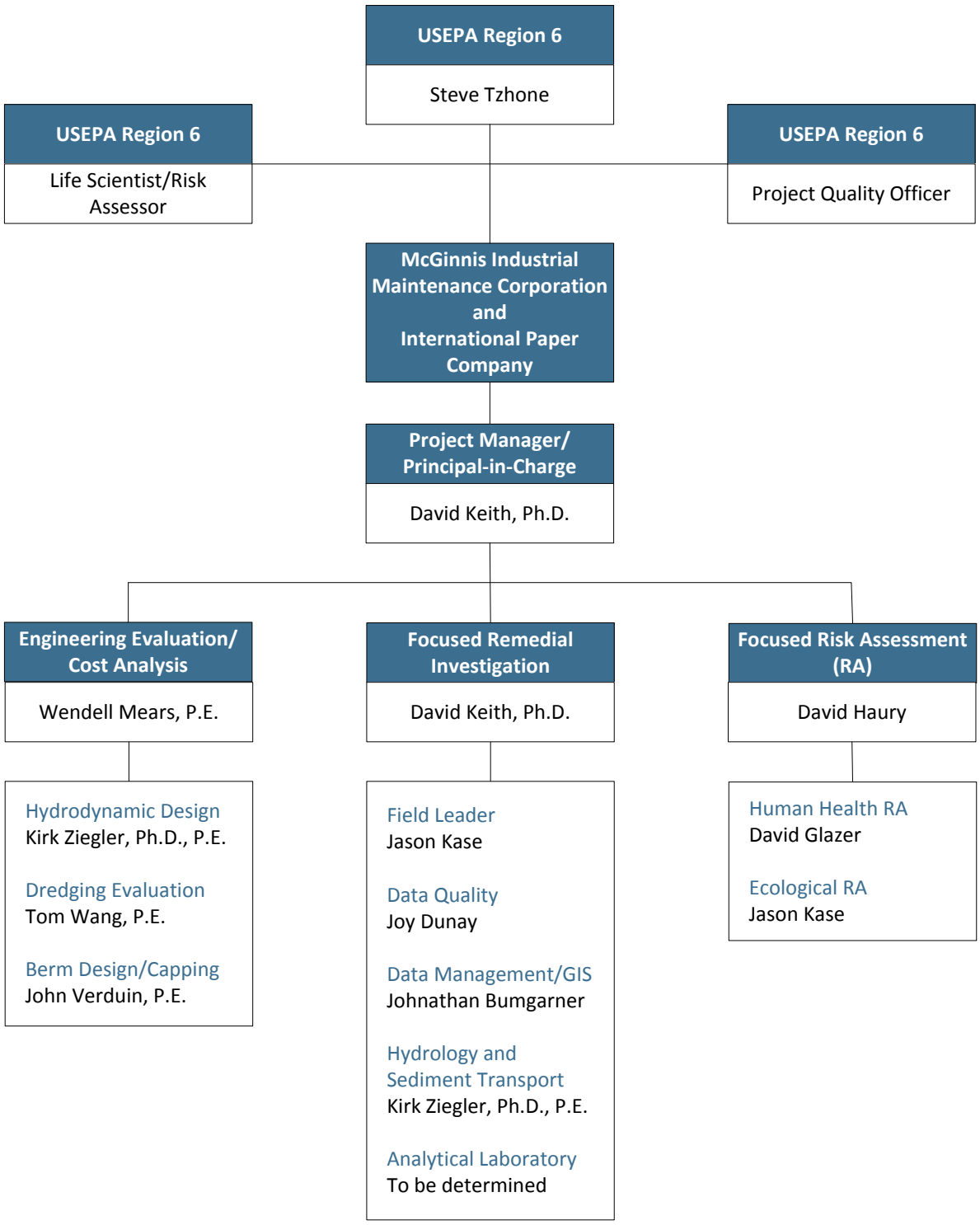

Figure 1-1
Project Organization Chart
General Work Plan Removal Action, Engineering Evaluation/Cost Analysis, and Focused Remedial Investigation
San Jacinto Waste Pits Site, Harris County

ANCHOR QEA

Figure 1-2
Site Map
General Work Plan Removal Action, Engineering Evaluation/Cost Analysis, and Focused Remedial Investigation
San Jacinto Waste Pits Superfund Site, Harris County, Texas

2 WORK OVERVIEW

Anchor QEA will undertake an adaptive management approach to the Work for the Site, whereby work is completed, results are evaluated, the understanding of the Site updated, and future work plans are revised as appropriate. The order of Work will be prioritized so that the potential for ongoing release of dioxin-contaminated material from the Site waste impoundments is addressed through a RA early in the process. This RA will be completed under an EE/CA and will include the investigation, design, and construction of a confined disposal facility ("CDF").

MIMC and IPC recognize that a potential for ongoing releases of dioxin-contaminated materials exists apparently as the result of the impacts from the dredging operations on the berm and shoreline of the waste impoundments. This potential release requires an early action to prevent further potential impacts to areas outside of the former waste impoundment boundaries. Future work following data collection activities associated with the design and implementation of the RA will occur in phases, and each phase of Work will be fully described in either work plans or Sampling and Analysis Plans (SAPs) that will be reviewed and approved by USEPA prior to initiation.

Dioxins and furans are the primary contaminant of concern ("COC") associated with Site waste impoundment materials and the focus of the RA, and subsequent FRI evaluations will be restricted to those contaminants. Data associated with seven samples of the source materials in the Site waste impoundments from the *Screening Site Inspection Report* (USEPA/TCEQ 2006) verify that this is a valid assumption. There were no detections of semi-volatile compounds, pesticides, or polychlorinated biphenyls in any of those samples, and although volatile organic compounds were not tested for, there is no indication that these compounds are, or should be present (e.g., there was no note of a volatile compound odor during the site inspection or subsequent waste impoundment investigations). Further review of source material samples results and other background information will be analyzed to determine whether additional COCs (i.e., metals) are appropriate for the Site.

2.1 General Tasks and Work Packages

Anchor QEA will prepare a Preliminary Site Characterization Report ("PSCR") as a first deliverable to document the current Site conditions around the waste impoundments and in the San Jacinto River north of the Interstate 10 bridge (I-10) based on available data. The PSCR will identify possible source areas and affected media, characterize the distribution of dioxins and furans across the Site using available data, and identify potential exposure pathways, migration routes, and potential receptors. This report will provide a basis for identifying data gaps early in the process and provide input to future sampling and analysis plans. The PSCR will conclude with a preliminary conceptual Site model ("CSM") that will be refined as new information is gathered and analyzed in subsequent investigations.

In association with the PSCR, Anchor QEA will prepare a Project Management Plan ("PMP"), Quality Assurance Project Plan ("QAPP"), Data Management Plan ("DMP"), and Health and Safety Plan ("HASP") to provide administrative and programmatic direction for the project, and to lay a foundation of subsequent Work Packages (either work plans or SAPs) in a phased RA and focused investigative approach. If needed, addenda to the HASP and other global plans will be prepared for each SAP to cover activities outside of the scope of the global documents.

After the PSCR is approved, Work Packages will be prepared detailing specific investigations or other work that will occur. This process will continue until the FRI is completed. The Work Packages anticipated for the Site include the following:

- Work Package 1 – Field Investigations and Engineering Design for Early RA of the Site Waste Impoundments
- Work Package 2 – Phase 1 Hydrology and Distribution of Dioxins and Furans in the San Jacinto River North of the I-10 Bridge
- Work Package 3 – Ecological and Human Health Risk Assessment For Dioxins and Furans in the San Jacinto River North of the I-10 Bridge

The focus of each of these Work Packages is discussed in more detail in Section 3. During preparation of each Work Package, and after the evaluations of data associated with each Work Package are completed, Anchor QEA will provide interim reports to the USEPA and

TCEQ to keep team members apprised of the progress of the Work. Anchor QEA will also integrate the interim reports into a complete Work report at the end of the process if needed.

3 SAMPLING AND ANALYSIS PLAN/QUALITY ASSURANCE PROJECT PLAN

Based on a phased or adaptive management approach, Anchor QEA will prepare a SAP for specific sampling events associated with each Work Package. The general project QAPP will describe the project objectives and organization, functional activities, and quality assurance and quality control ("QA/QC") protocols that will be used to achieve the desired Data Quality Objectives ("DQOs") for each phase of the Work. In addition, the QAPP will address sample custody, analytical procedures, data reduction, validation, and reporting.

Task specific SAPs will be submitted separately to USEPA for approval prior to implementation of any field activities as the need arises. The SAPs will define in detail the DQOs and sampling and data gathering methods that will be used for the project to define the nature and extent of contamination, and perform the ecological and human health risk assessment. At a minimum, each SAP will include sampling objectives, sample location and frequency, sampling equipment and procedures, and sample handling and analysis. The SAP will be written so that a field sampling team unfamiliar with the Site would be able to gather the samples and field information if required. Anchor QEA will refer to USEPA's guidance document *Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (USEPA 1988b), which describes the SAP format and the required content.

Anchor QEA will demonstrate in advance, to USEPA's satisfaction, that each analytical laboratory it may use is qualified to conduct the proposed Work. This includes use of methods and analytical protocols for COCs in the media of interest within detection and quantification limits consistent with both QA/QC procedures and the DQOs approved in the QAPP for the Site by the USEPA.

4 WORK PACKAGES

As discussed in Section 2, the planned RI Work will be divided into the Work Packages. The Work will be conducted in the general order presented below; however, there may be significant overlap between data collection, analyses, and evaluations in the Work Packages.

4.1 Work Package 1 – Field Investigations and Engineering Design for Early Removal Action of the Site Waste Impoundments

This Work Package will involve evaluating a non-time-critical RA of the impoundments through an EE/CA process. The process will involve collecting chemical and engineering data required to develop engineering design documents for an early RA of the Site waste impoundments as a potential active source of dioxins and furans to areas outside of the former bermed area. The EE/CA analysis will include Site characterization and streamlined risk assessment for the impoundment area, identification of RA objectives, identification of RA alternatives, a comparative analysis of RA alternatives, and a recommended RA alternative. The EE/CA analysis will be followed by a Design Analysis Report, which will include the engineering design drawings for the RA.

The proposed RA will require keys at the toe of the berms to be dredged or excavated for berm rehabilitation in some areas of the Site. There will be a need to collect other information, in addition to engineering data, about those areas in order to support the selection of equipment and provide information on the volume of material to be removed, the potential production rate, the potential mobilization of sediment or desorption of COCs during excavation/dredging, the settling rate of removed material for disposal, and the potential need for additional remedial measures after source removal.

Measurements required for an RA evaluation include:

- For potential dredging areas:
  - Bathymetric survey
  - Geotechnical index properties
  - Strength properties
  - Bulking properties

  - Elutriate tests
  - Dioxin and furan concentrations below the anticipated removal depth
- For berm and the interior CDF/waste impoundment areas:
  - Geotechnical index properties
  - Settlement properties
  - Strength properties

Specific geotechnical field measurements and tests that are required to evaluate dredging, berm construction, and capping alternatives include:

- Geotechnical Index Properties. Atterberg limits, water content, grain size, specific gravity, and bulk density will be measured on selected samples representative of the range of sediment conditions in the potential dredge areas. These data will be used to predict:
  - The behavior of the sediments during removal
  - Correlated strength of the sediment in source removal and cap areas
  - Volume and bulking of sediments in the remedial area
- Settlement Properties. Undisturbed sediment samples will be tested to evaluate settlement from placing caps over in situ sediments. Settlement properties are also required to properly size, design containment berms for, and predict the behavior of caps over confined disposal areas. Total settlement and time rate of settlement will be evaluated through laboratory testing of undisturbed sediment samples.
- Bulking Properties. Column settling tests and geotechnical index properties will be used to evaluate bulking of removed source material during excavation/dredging. Bulking information will facilitate sizing the disposal facility, if necessary, and will enhance the understanding of the type of equipment required. If the size of the disposal facility is constrained, the settling tests will provide an indication of the possible rate of disposal, which could dictate the removal rate and affect the cost and feasibility of different alternatives.
- Strength Properties. In situ strength of the sediments will be measured using field vane shear equipment. This information will be used to evaluate acceptable cap lift thickness and to design containment berms for the CDF. This information will also

be used to help specify side slopes in removal areas. Strength will also be correlated to geotechnical index parameters and will be measured using laboratory tests on undisturbed samples if necessary.

In addition, hydrodynamic data will be collected and analyzed to ensure that proper armoring and long-term shoreline protection measures are included in the RA design. This will involve the following data collection and analysis efforts:

- Develop a site-specific circulation model of the area to assess the hydrodynamics of the Site during an extreme event (e.g., 100-year return interval storm surge) by computing the patterns of water depth, flow velocity, and shear stress
- Gather recent bathymetry and topography survey data as necessary
- Determine type and size of armoring required along the berm impoundments to resist the predicted flow velocity generated during the design storm surges
- Determine the elevation to which armor protection will have to be placed
- If appropriate, classify typical vessels passing through the San Jacinto River Channel and adjacent areas and select a subset design vessels for evaluation of shore protection requirements for protection of vessel wake impacts
- Estimate an appropriately conservative design wave/surge from a typical vessel sailing line to the shoreline using empirical data as appropriate.
- Determine type, size, and template of the armoring required along the shoreline and levee structures to protect the berms.

4.2 Work Package 2 – Phase 1 Hydrology and Distribution of Dioxins and Furans in the San Jacinto River North of the Interstate 10 Bridge

Work Package 2 will include development of a detailed Work Plan and subsequent field work to develop an understanding of the distribution of dioxins and furans both laterally and vertically in potentially affected media (sediment, surface water and biota) in the San Jacinto River north of the I-10 bridge. In addition, an evaluation of sediment transport mechanisms and the erosional and depositional characteristics of the potentially affected area of the San Jacinto River north of I-10 will be conducted as part of this Work Package. These data and analyses will assist in development of future field studies and provide an overall

understanding of the distribution of dioxins and furans and river hydraulics within the environment of the San Jacinto River.

4.3 Work Package 3 – Ecological and Human Health Risk Assessment for Dioxins and Furans in the San Jacinto River North of the Interstate 10 Bridge

In order to determine whether concentrations of dioxin and furans in sediment, water, or biota potentially pose an unacceptable risk to ecological or human health receptors, additional field data collection tasks may be developed in this phase of the project.

Anchor QEA will prepare a work plan and perform the ecological risk assessment ("ERA") and human health risk assessment ("HHRA") that considers exposure of dioxins and furans to appropriate receptors in accordance with relevant USEPA guidance documents (USEPA 1989, 1997, 1998a, 1998b) and other relevant and required documents and guidance as outlined in the AOC and will interact closely with the USEPA's Remedial Project Manager and risk assessment staff assigned to the Site. The scope of the ERA and HHRA will be determined through a phased approach as outlined in the USEPA's guidance documents.

5 REFERENCES

TCEQ and USEPA. 2006. Screening Site Assessment Report San Jacinto River Waste Pits, Channelview, Harris County, Texas, TXN000606611.

USEPA 1989. Risk Assessment Guidance for Superfund - Volume I Human Health Evaluation Manual (Part A), December 1989, EPA/540/1-89/002.

USEPA 1997. "Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments." Office of Emergency and Remedial Response. USEPA/540-R-97-006. June 5, 1997.

USEPA 1998a. Guidelines for ecological risk assessment. EPA/630/R-95/002F. April 1998.

USEPA 1998b. Risk Assessment Guidance for Superfund, Volume 1 - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments). Interim. Process for Designing and Conducting Ecological Risk Assessments. Office of Solid Waste and Emergency Response. EPA/540-R-97-033. January 1998.